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LV8019LP

Bi-CMOS IC Forward/Reverse Motor Driver

Overview

The LV8019LP is a forward/reverse motor driver.

Features

- One H-bridge driver channel
- Provides a constant current output
- Built-in thermal shutdown circuit

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$ and $SGND = PGND = 0V$

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	V_M max		-0.5 to 8.4	V
Control block supply voltage	V_{CC} max		-0.5 to 7.0	V
Constant current output block supply voltage	V_{RG} max		-0.5 to 6.0	V
Maximum output current	I_O max		1.2	A
	I_O peak1	$t \leq 200\text{ms}$, $f = 2\text{Hz}$	3	A
	I_O peak2	$t \leq 10\text{ms}$, $f = 2\text{Hz}$	5	A
Input signal voltage	V_{IN} max		-0.5 to $V_{CC}+0.5$	A
Allowable power dissipation	P_d max1	Independent IC	0.2	W
	P_d max2	When mounted on a circuit board *1	1.05	W
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

* : Specified substrate : $40 \times 50 \times 0.8\text{mm}^3$, glass epoxy four-layer (2S2P) board

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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Recommended Operating Conditions at $T_a = 25^\circ\text{C}$ and $\text{SGND} = \text{PGND} = 0\text{V}$

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	V_M		3.0 to 7.4	V
Control block supply voltage	V_{CC}		2.7 to 6.0	V
Constant current output block supply voltage	V_{RGIN}		1.5 to V_{CC}	V
Input signal voltage	V_{IN}		0 to V_{CC}	V
Maximum input signal frequency	f_{max}	Duty = 50%	100	kHz

Electrical Characteristics $T_a = 25^\circ\text{C}$, $V_{CC} = V_M = 5\text{V}$, and $\text{SGND} = \text{PGND} = 0\text{V}$ unless otherwise specified.

Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Standby mode output block current consumption	I_{MO}	$\text{EN} = 0\text{V}$, $\text{IN1} = \text{IN2} = \text{ICTRL} = 0\text{V}$			1.0	μA	
Control block current consumption	Standby mode	$\text{EN} = 0\text{V}$, $\text{IN1} = \text{IN2} = \text{ICTRL} = 0\text{V}$		0	1.0	μA	
	Operation mode	$\text{EN} = 5\text{V}$		0.8	1.3	mA	
High-level input voltage	V_{INH}	IN^*	2.5		V_{CC}	V	
Low-level input voltage	V_{INL}	IN^*	0		0.8	V	
High-level input current	I_{INH}	IN^*			1.0	μA	
Low-level input current	I_{INL}	IN^*	-1.0			μA	
High-level EN pin current	I_{ENH}	EN	15	25	35	μA	
Low-level EN pin current	I_{ENL}	EN			1.0	μA	
Output on resistance	1	R_{ON1}	$V_M = 5\text{V}$, sink + source		0.30	0.40	Ω
	2	R_{ON2}	$V_M = 3\text{V}$, sink + source		0.45	0.60	Ω
ISET setting resistance	RSET	Between ISET pin and SGND	80			Ω	
ISET pin voltage	V_{ISET}	$R_{SET} > 80\Omega$	0.90	1.05	1.20	V	
CC pin output saturation voltage	V_{CSAT}	$R_{SET} = 150\Omega$ *1			1.5	V	
CC pin output leakage current	I_{CONL}	$\text{CTRL} = 0\text{V}$			1.0	μA	
Low voltage shutdown operation voltage	V_{LVD}	V_{CC} pin voltage detection	2.10	2.35	2.60	V	
High-level output turn-on time	TOH	The transition from 10% to 90% of the output amplitude *2		0.1	1.0	μs	
Low-level output turn-on time	TOL	The transition from 90% to 10% of the output amplitude *2		0.2	2.0	μs	
Thermal shutdown temperature	TSD	*2	150	180		$^\circ\text{C}$	
Thermal shutdown hysteresis	ΔTSD	*2		40		$^\circ\text{C}$	

*1 : Voltage between CC pin and ISET pin

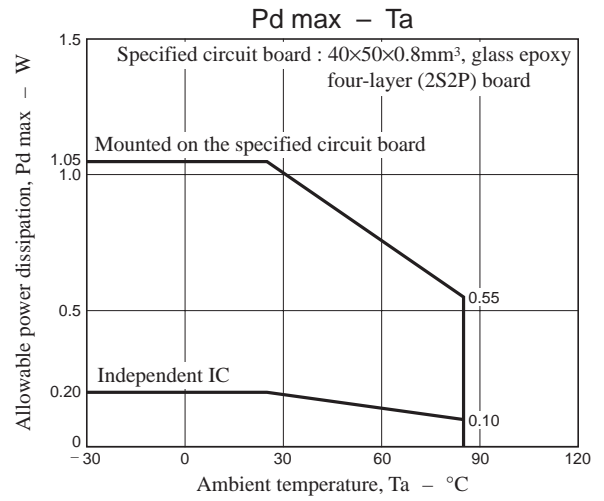
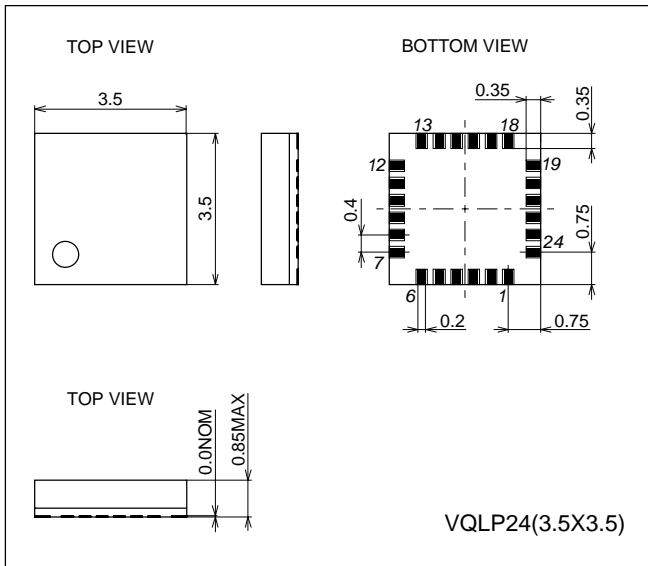
*2 : Design guarantee: These characteristics are not measured.

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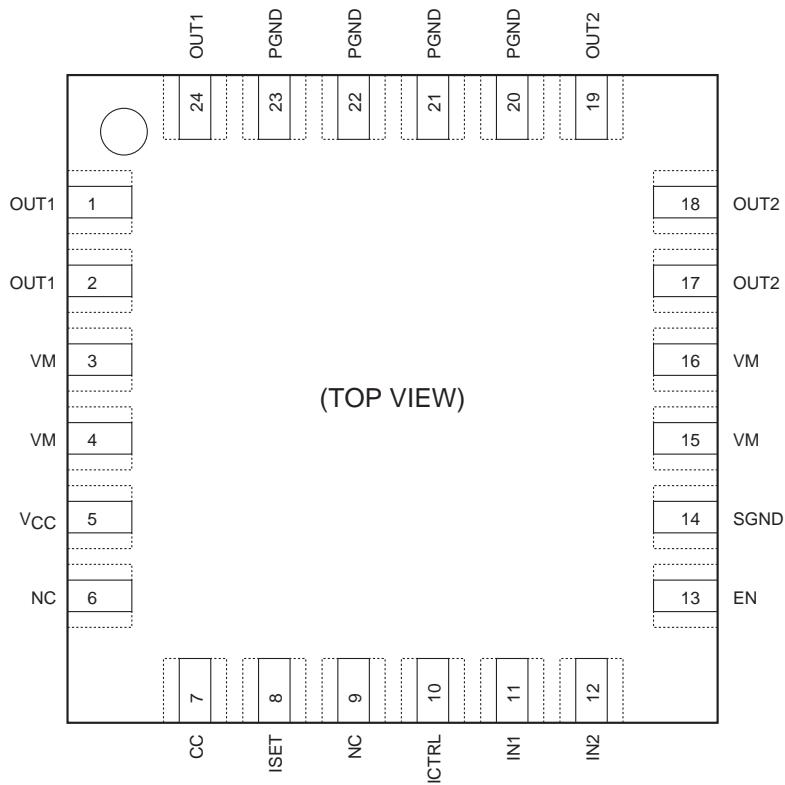
Package Dimensions

unit : mm (typ)

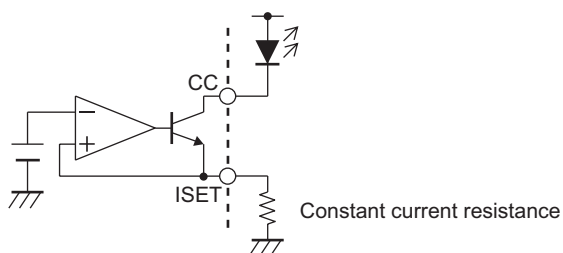
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Pin Assignment

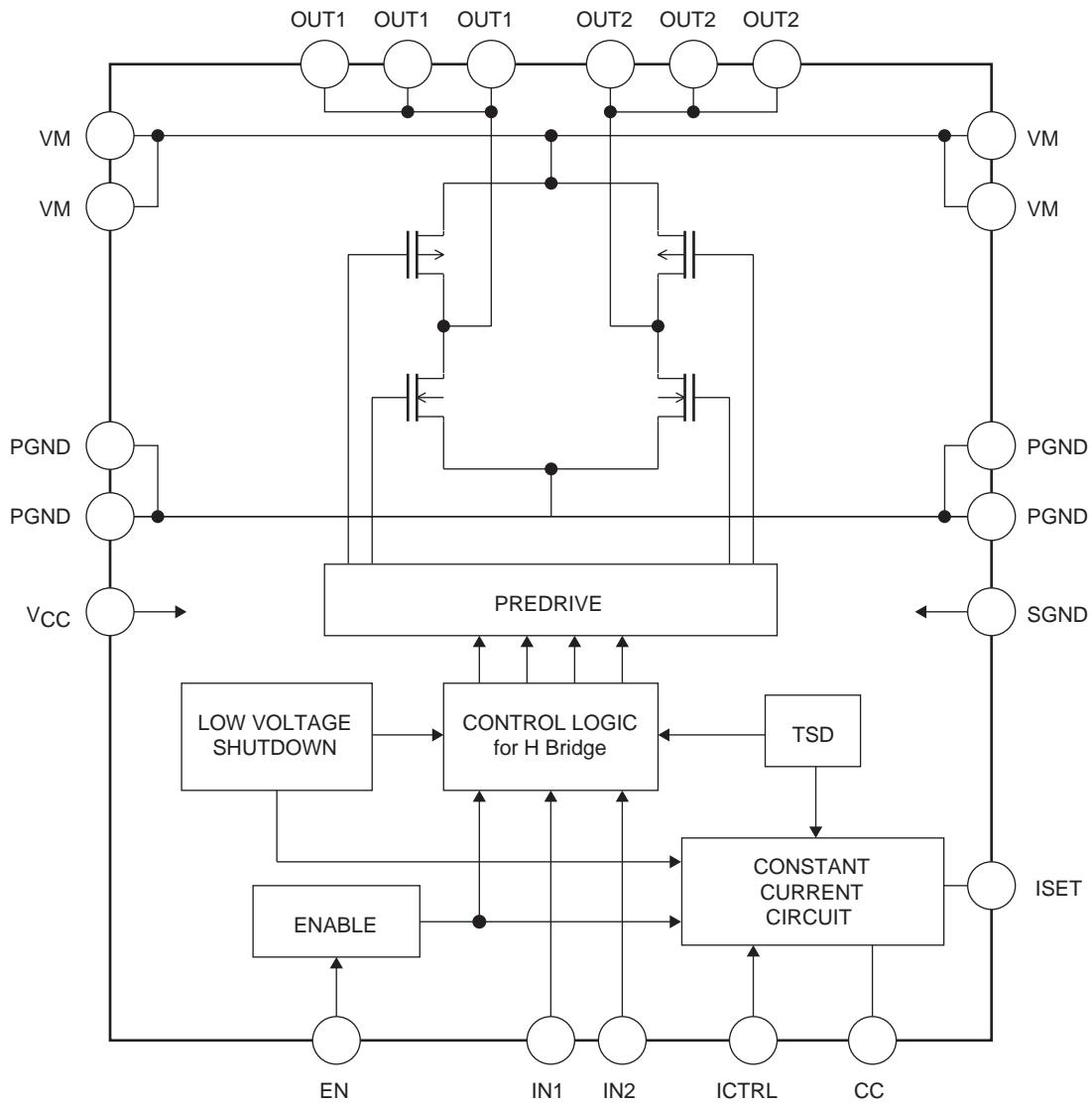


Constant current output



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Block Diagram



Truth Table

EN	IN1	IN2	CTRL	OUT1	OUT2	CC	Mode
H	H	H	X	L	L	X	Break
H	H	L	X	H	L	X	Forward
H	L	H	X	L	H	X	Reverse
H	L	L	X	Z	Z	X	Standby
L	X	X	X	L	L	L	Standby
H	X	X	L	X	X	Z	Constant current output off
H	X	X	H	X	X	ON	Constant current output on

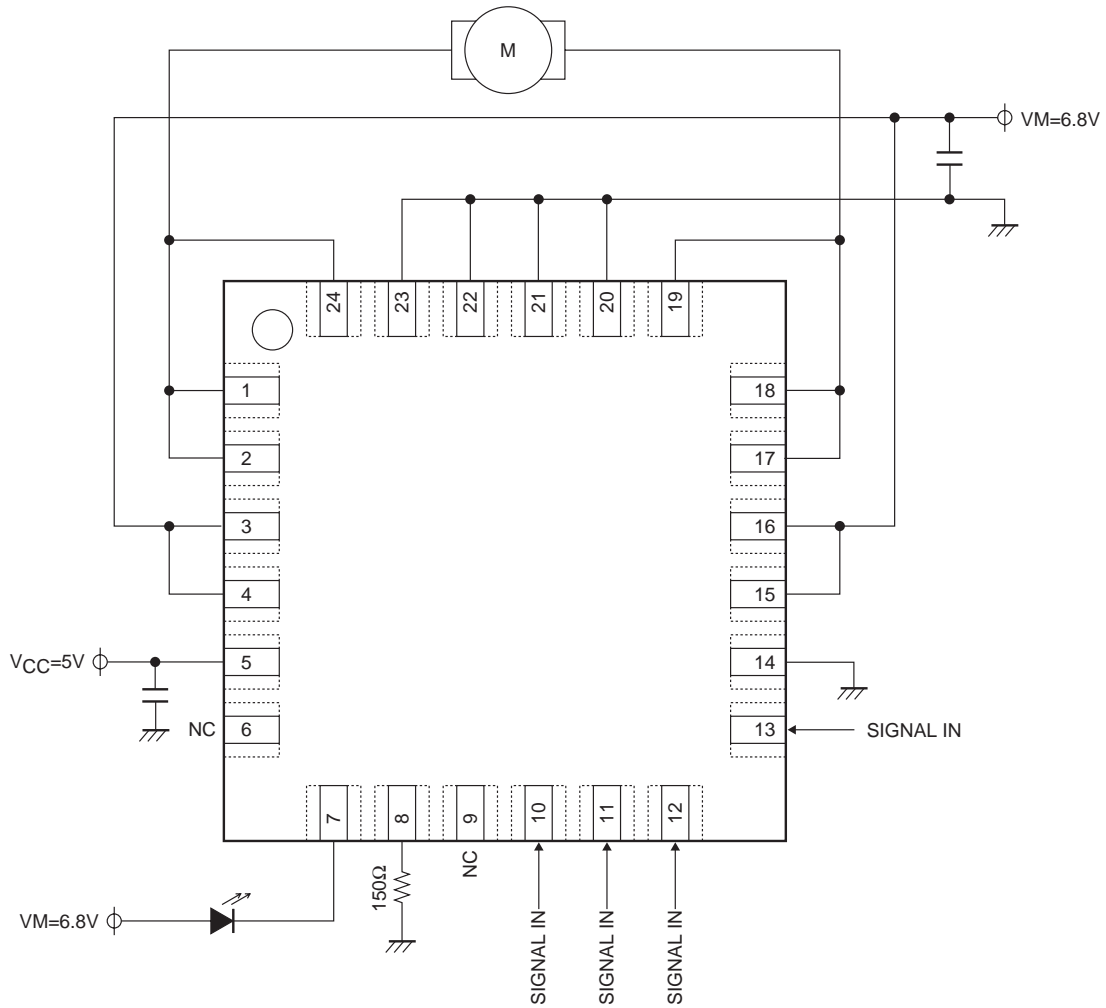
H : High level
 L : Low level
 Z : Hi-impedance
 X : Don't care

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Pin Functions

Pin No.	Pin	Description	Equivalent circuit
11 12	IN1 IN2	Logic input 1 Logic input 2 The output is set by the combination of the input 1 and 2 states. See the truth table for details.	
10	ICTRL	Controls the output on/off state of the constant current block.	
13	EN	EN pin Controls the on/off state of the H-bridge output (OUT1 and OUT2) and the constant current output. See the truth table for details.	
1, 2, 24, 17, 18, 19	OUT1 OUT2	Output 1 Output 2 The source side is a p-channel transistor and sink side is an n-channel transistor.	
7 8	CC ISET	Constant current output Constant current setting The output current (CC) is set by connecting a resistor between the ISET pin and ground.	
5	VCC	Signal system power supply	
3, 4, 15, 16	VM	Power system power supply	
14	SGND	Signal system ground	
21, 22, 23	PGND	Power system ground	

Application Example



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